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**General Mills, Inc.**  
**Mechanical Division**

**ENGINEERING RESEARCH & DEVELOPMENT  
DEPARTMENT**

**2003 EAST HENNEPIN AVENUE  
MINNEAPOLIS 13, MINN.**

FINAL REPORT

CONTRACT NO. Nonr 875(00)

ANNEX II

Prepared for

The Office of Naval Research  
Washington 25, D. C.

This document has been reviewed in accordance with  
OPNAVINST 5510.17, paragraph 5. The security  
classification assigned to it is correct.

Dated: 9/7/54 K. E. Wright  
By direction of  
Chief of Naval Research (Code 44)

Report No. 1308

10 June 1954

Prepared by: Keith C. Giles

Approved by:

Cledo Brunetti  
Cledo Brunetti, Director

GENERAL MILLS, INC.  
Mechanical Division  
ENGINEERING RESEARCH AND DEVELOPMENT  
2003 E. Hennepin Ave.  
Minneapolis 13, Minn.

## FINAL REPORT CONTRACT Nonr 875(00)

### ANNEX II

#### I. AIMS

On 29 May 1952, Contract Nonr 875(00) between General Mills, Inc. and the Office of Naval Research was amended to provide for the launching of "Skyhook" plastic balloons to carry scientific instruments to high altitudes. Scientific payloads were supplied by the Evans Signal Corps Engineering Laboratories. General Mills, Inc. supplied "Skyhook" balloons, balloon controls and safety equipment. Engineering services for launching and telemetering altitude information were also supplied by General Mills technical personnel.

#### II. WORK ACCOMPLISHED

Flight work on this project was carried out in July and August of 1953 and in May of 1954.

Six flights were made in the Summer of 1953, flights number 1000, 1038, 1042, 1045, 1047 and 1048. In all cases, 85-foot "Skyhook" balloons were used to carry the following equipment to high altitudes.

1. The scientific payload, an ozone counter, supplied by the Evans Signal Corps Engineering Laboratories.
2. Release timer, a clock mechanism set to fire a squib, severing the instruments from the balloon at a predetermined time.
3. Parachute, to return the instruments safely to earth after being released from the balloon.
4. Radio transmitter, pressure actuated to transmit pressure altitude data.

5. Cameras facing both up and down.
6. Safety switch, set to release the payload if balloon should float below 30,000 ft.

In addition to these standard items, two flights, number 1000 and 1038, carried a radio release, a device designed to separate the load from the balloon on radio command actuated from the ground or from an aircraft. Two flights, 1000 and 1045, failed prematurely; flight 1000 from premature radio release (improperly assembled by field technicians), and flight 1045 from balloon failure while rising. One flight, 1042, failed on reaching ceiling due to a restricted appendix. The remaining three flights performed successfully.

Two flights were made in May of 1954, flights number 1138 and 1139. These two flights were similar to those made in 1953 in that they utilized 85-foot "Skyhook" balloons and carried release timers, safety timers, pressure-sensitive radio transmitters, and parachutes, all of which are standard balloon flight accessories. Rather than carrying an ozone counter as the main load, the primary objective was to obtain meteorological trajectory data for analysis by the Meteorological Branch of the Evans Signal Corps Engineering Laboratories. Down cameras were used for trajectory and altitude purposes. Additional altitude information was derived from barographs and altitude telemeters. A secondary load was provided on each flight. Flight 1138 carried a dew point hygrometer for New York University, and on 1139 a cosmic ray counter for the University of Minnesota was flown. In addition, several "hitch-hike" payloads were carried aloft. Both flights performed successfully.

Flight data on all flights are presented in the next section.

General Mills, Inc. is happy to have been able to work with the personnel of Evans Signal Corps Engineering Laboratories and the Office of Naval Research in carrying out these high altitude scientific experiments and hopes all payloads performed satisfactorily and met with success.

DATA FROM EXPERIMENTAL CODESONDE 1745 KC

FLIGHT NO 1000  
 FLOWN 5 AUGUST 1953  
 FOR 65007 STROUD  
 LOAD ON BALLOON 178#  
 FREE LIFT 345 = 104  
 BALLOON TYPE MATERIAL NUMBER WEIGHT  
 85 CARL #294 4 151#

PREMATURE RADIO RELEASE 0818.5 C.S.T.

AVERAGE RATE OF RISE  
 317 FT/MIN  
 TO 7100 FT

LAUNCH SITE  
 U OF MINN AIRPORT  
 0759 C.S.T.

IMPACT, 2 MI E  
 U OF MINN AIRPORT  
 0824.5 C.S.T.

ELAPSED TIME IN HOURS  
 0  
 0800  
 0700

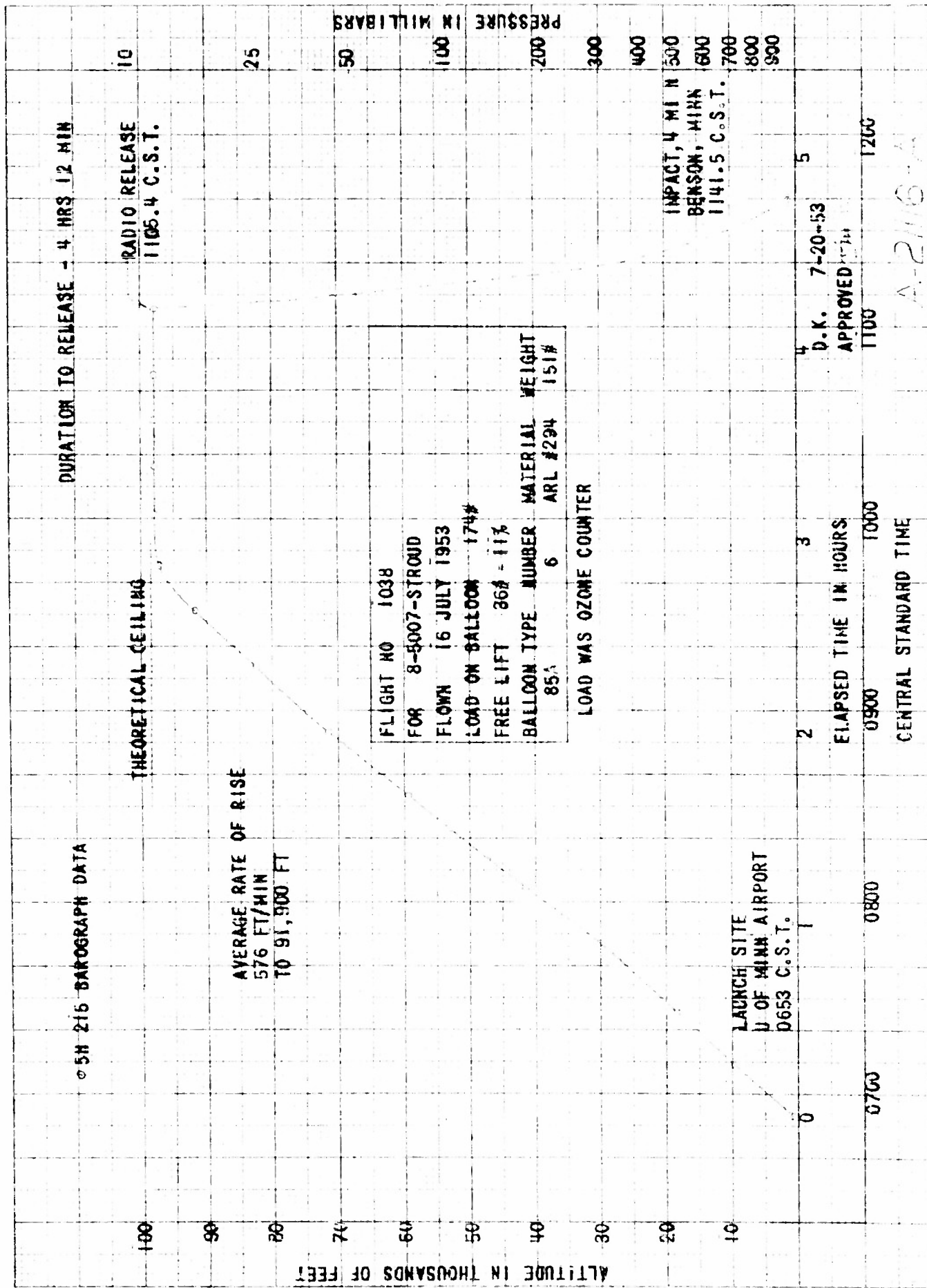
D.R. 8-28-53  
 APPROVED

A-2145-A

ALTITUDE IN THOUSANDS OF FEET  
 10  
 8  
 6  
 4  
 2  
 0

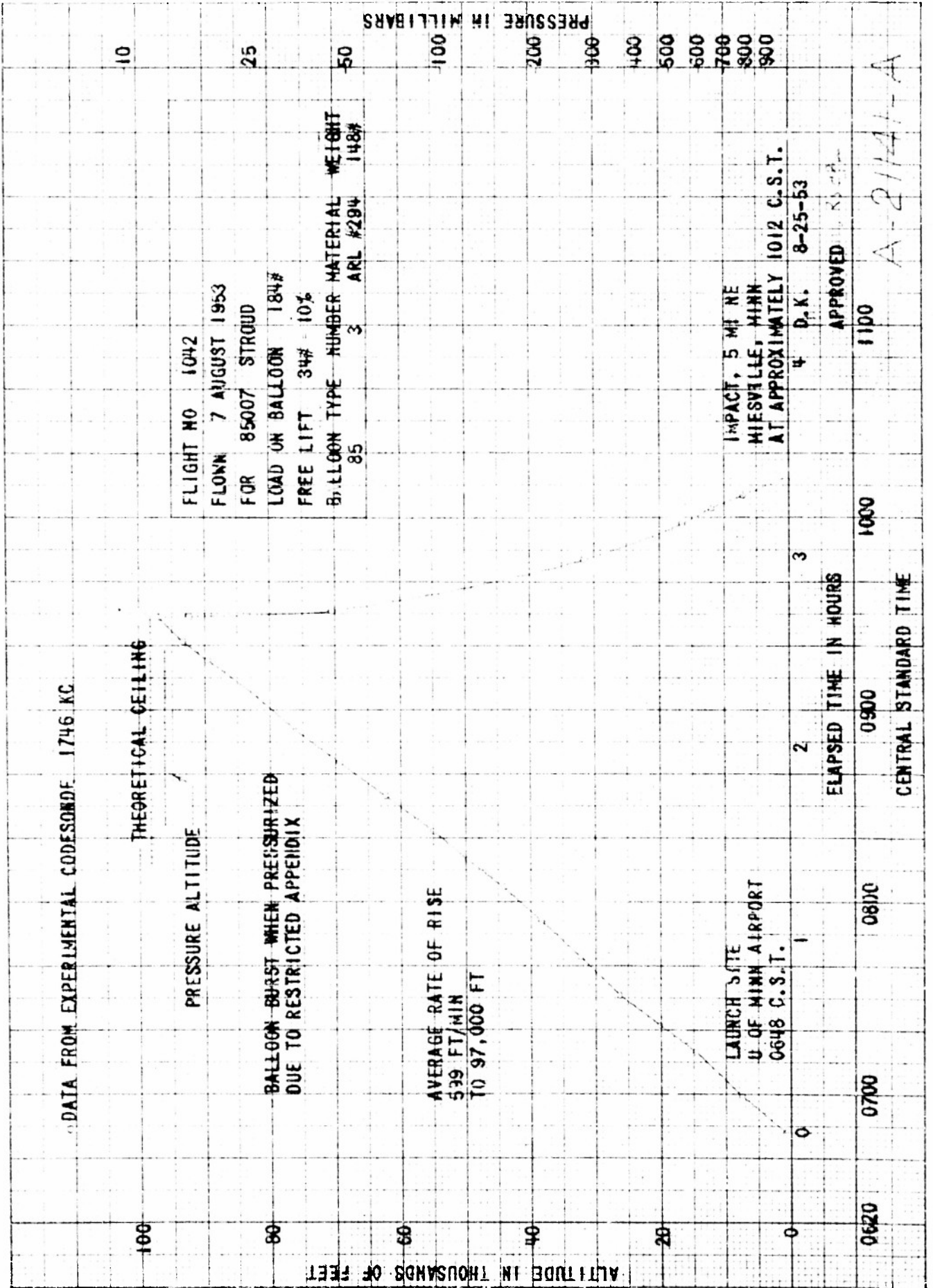
PRESSURE IN MILLIBARS  
 700  
 800  
 900





JUN 17 1954

GENERAL STILES, JR., ENGINEERING RESEARCH AND DEVELOPMENT DEPARTMENT, MINNEAPOLIS, MINN.



A-2141-A

# 511 223 BAROGRAPH DATA

## THEORETICAL CEILING

FLIGHT NO 1045  
 FLOWN 13 AUGUST 1953  
 FOR 85007 STROUD  
 LOAD ON BALLOON 135#  
 FREE LIFT 38# 11%  
 BALLOON TYPE NUMBER MATERIAL WEIGHT  
 55 2 ARL #294 133#

TEMPERATURE DATA,  
 ST CLOUD STATION  
 REPORT 131500Z

AVERAGE RATE OF RISE  
 932 FT/MIN  
 TO 51,700 FT

LAUNCH SITE  
 U OF MINN AIRPORT  
 0830 C.S.T.

IMPACT, 141 S  
 DOWNING, WIS  
 APPROXIMATELY 0800 C.S.T.

D.K. 8-25-53

ELAPSED TIME IN HOURS

TEMPERATURE IN °C

0700 0800

0600

CENTRAL STANDARD TIME

0900

ALP 43-A

PRESSURE IN MILLIBARS

BALLOON BURST 0730.5 C.S.T.

JUN 17 1954

ST. LOUIS, MINN.

GENERAL MILLS FOR THE UNIVERSITY OF MINN.

DATA FROM EXPERIMENTAL CODES CODE 1742 KC

THEORETICAL CEILING

RATE OF RISE  
868 FT/MIN  
TO 98,600 FT

LAUNCH SITE  
U OF MINN AIRPORT  
0641 C.S.T.

IMPACT 3 MILE FLYING CLOUD AIRPORT  
MINNEAPOLIS, MINN  
1136 C.S.T.

OBSERVED LOAD RELEASE, 1052 C.S.T.

FLIGHT NO	1047
FLOWN	17 AUGUST 1953
FOR	85007 STROUD
LOAD ON BALLOON	172#
FREE LIFT	52# - 133
BALLOON TYPE	NUMBER MATERIAL
85	1 ARL #294
	WEIGHT
	142#

ALTITUDE IN THOUSANDS OF FEET

PRESSURE IN MILLIBARS

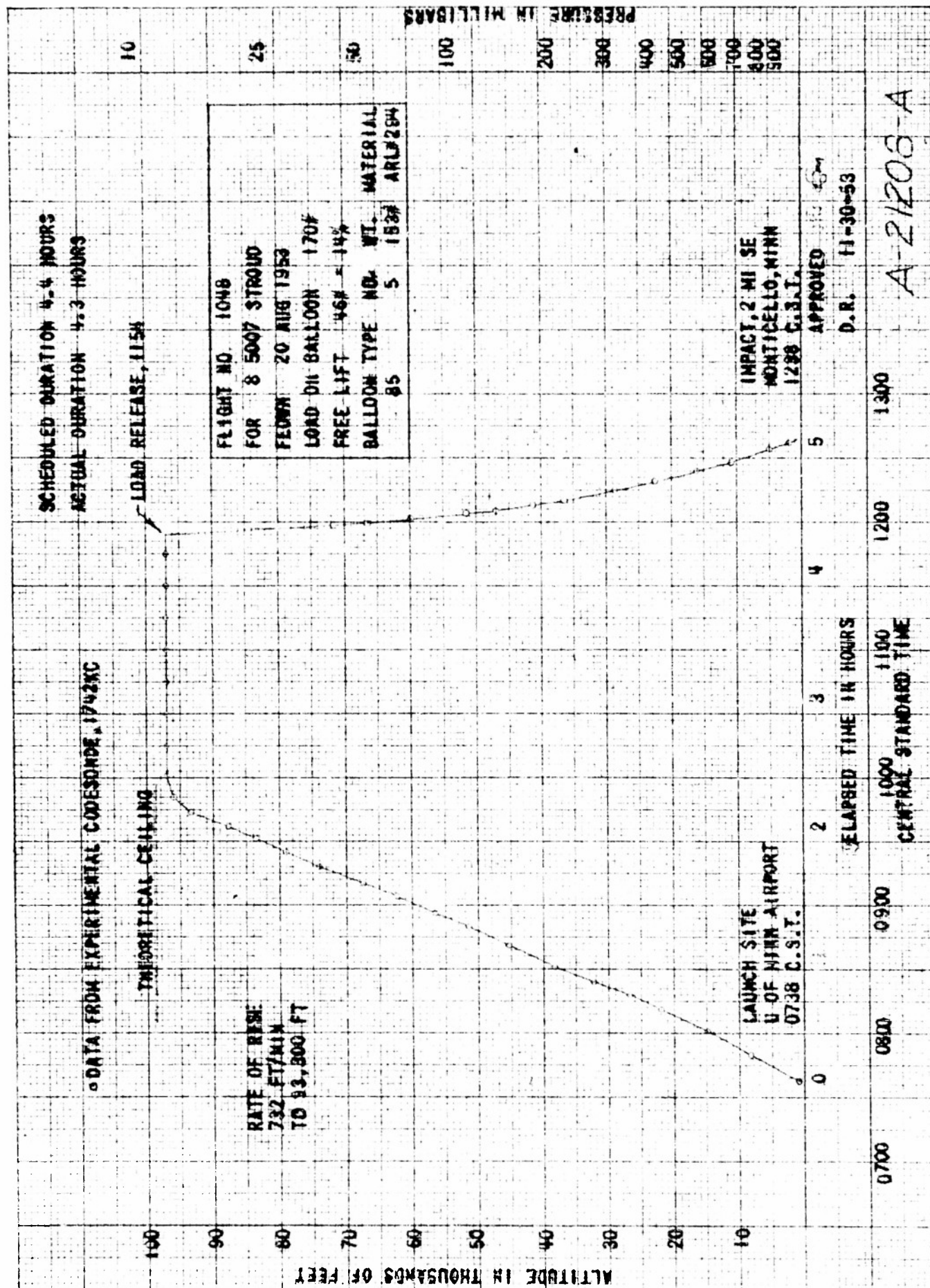
ELAPSED TIME IN HOURS	CENTRAL STANDARD TIME
0	0700
1	0800
2	0900
3	1000
4	1100
5	1200

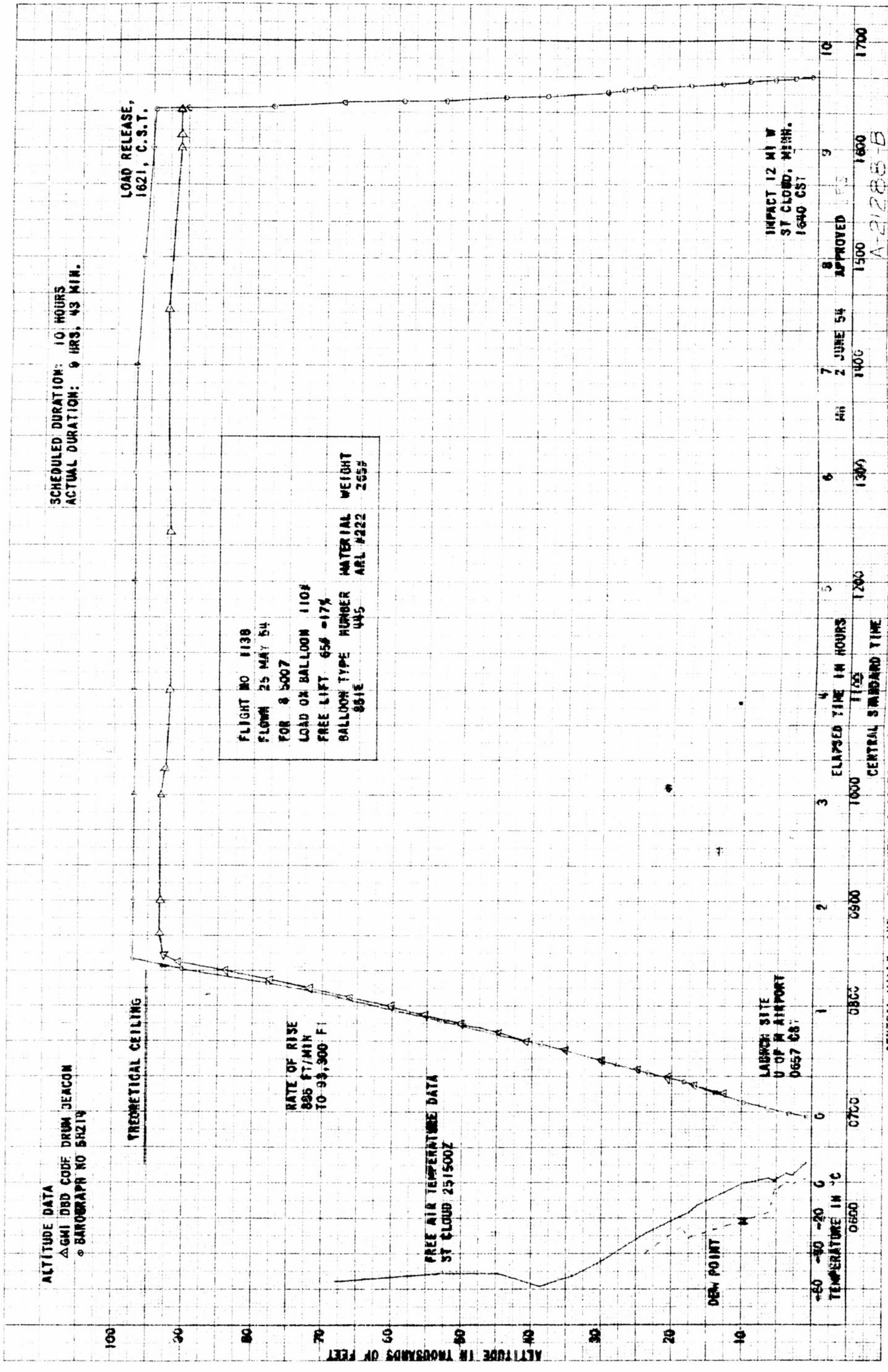
APPROVED

D.K. 8-25-53

A-2142-A



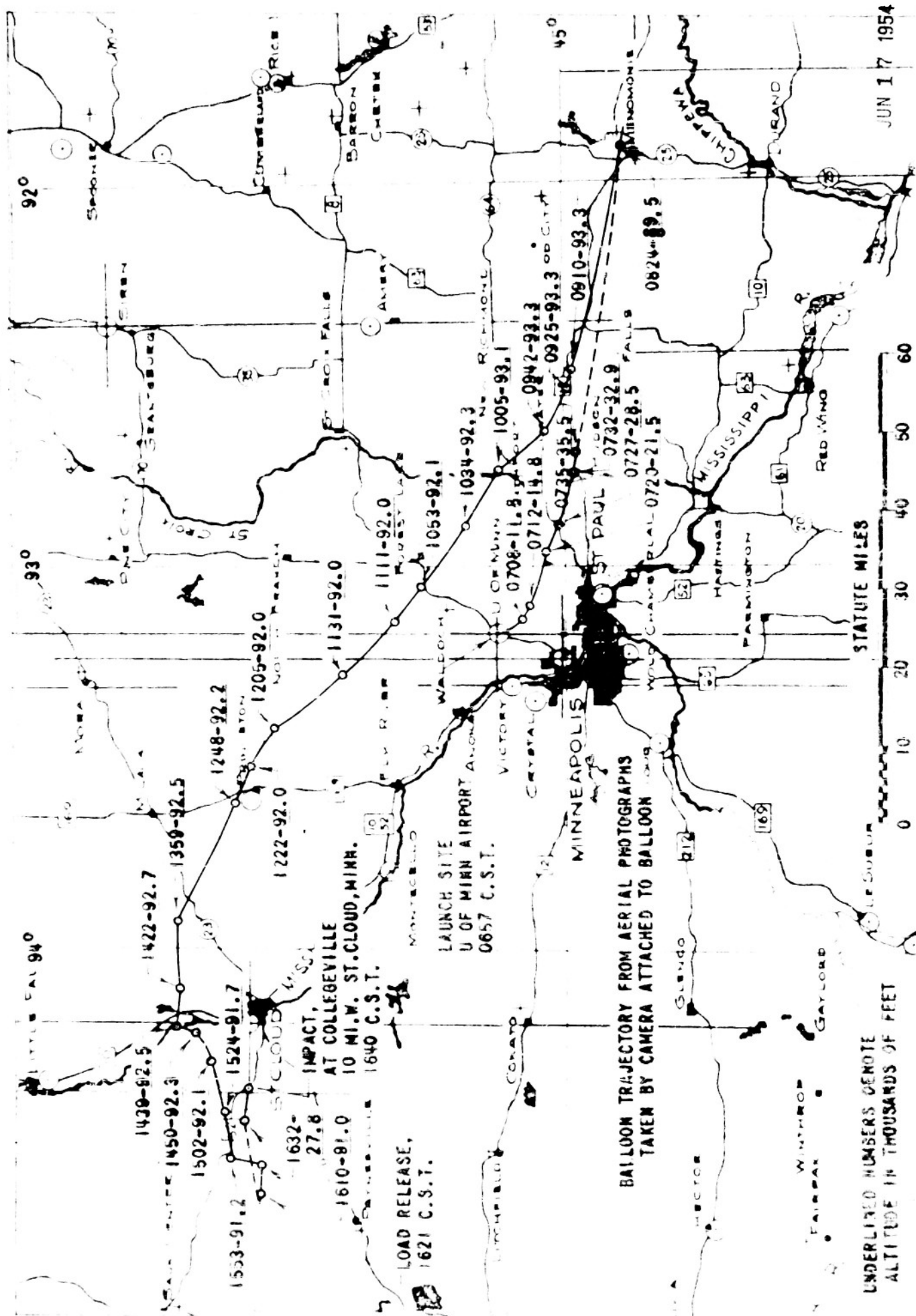




GENERAL HILLS, INC., ENGINEERING RESEARCH AND DEVELOPMENT DEPARTMENT, MINNEAPOLIS, MINN.

JUN 17 1954





JUN 17 1954

BALLOON TRAJECTORY, FLIGHT NO. 1139,

FLOWN 25 MAY 1954, FOR 8 5007

SCALE  
1:1,000,000

PROJ 8 5007

DATE 15 JUN 54

CENTRAL STANDARD TIME

GENERAL MILLS INC., ENGINEERING RESEARCH AND DEVELOPMENT DEPT., MINNEAPOLIS, MINNESOTA

BALLOON TRAJECTORY FROM AERIAL PHOTOGRAPHS  
TAKEN BY CAMERA ATTACHED TO BALLOON

UNDERLINED NUMBERS DENOTE  
ALTITUDE IN THOUSANDS OF FEET

1430-92.5  
1450-92.3  
1502-92.1  
1524-91.7  
1553-91.2

1222-92.0  
1205-92.0  
1131-92.0  
1111-92.0  
1053-92.1

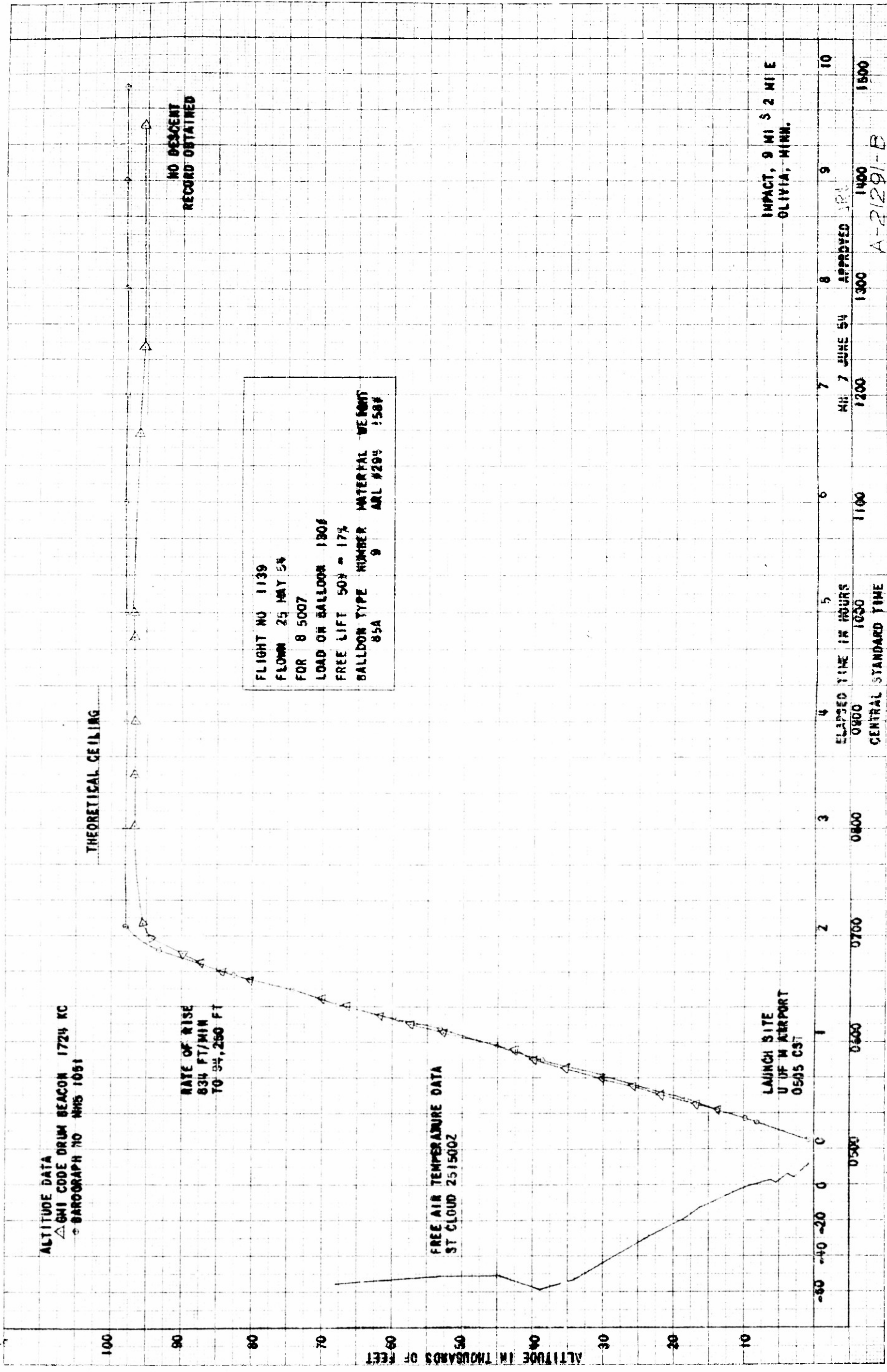
LOAD RELEASE,  
1621 C.S.T.  
1610-91.0  
27.8  
IMPACT,  
AT COLLEGEVILLE  
10 MI.W. ST.CLOUD, MINN.  
1640 C.S.T.

LAUNCH SITE  
U OF MINN AIRPORT ALONG  
0657 C.S.T.

0708-11.8  
0712-14.8  
0735-35.5  
0732-32.9  
0727-28.5  
0720-21.5  
0824-89.5  
0910-93.3  
0925-93.3  
1005-93.1

STATUTE MILES





GENERAL MILLS, INC., ENGINEERING RESEARCH AND DEVELOPMENT DEPARTMENT: MINNEAPOLIS, MINN.

JUN 17 1954



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